

Practitioners of the martial arts have long seen a need for a precise method of measuring the power of a karate kick or a boxer's punch in training and competition. In the customary approach, an instructor estimates the force employed in splintering boards or smashing bricks by sight and sound, or a sparring partner considers the sound and feel of a blow to his body shield and gauges the blow's power. Such subjective

judgments are inexact.

Barry French, a martial arts veteran of 17 years with black belts in karate and Tae Kwon Do, wanted a precise method of assessing his own power and that of the students he instructs. There was no system on the market—so he decided to develop one. The result of several years of research, including input from Lewis Research Center, is the Impax line of force measurement products, which has excited wide at-

tention and favorable comment among the martial arts community. The equipment is marketed by Impulse™ Sports Training Systems, Bay Village, Ohio, a company formed by Barry French.

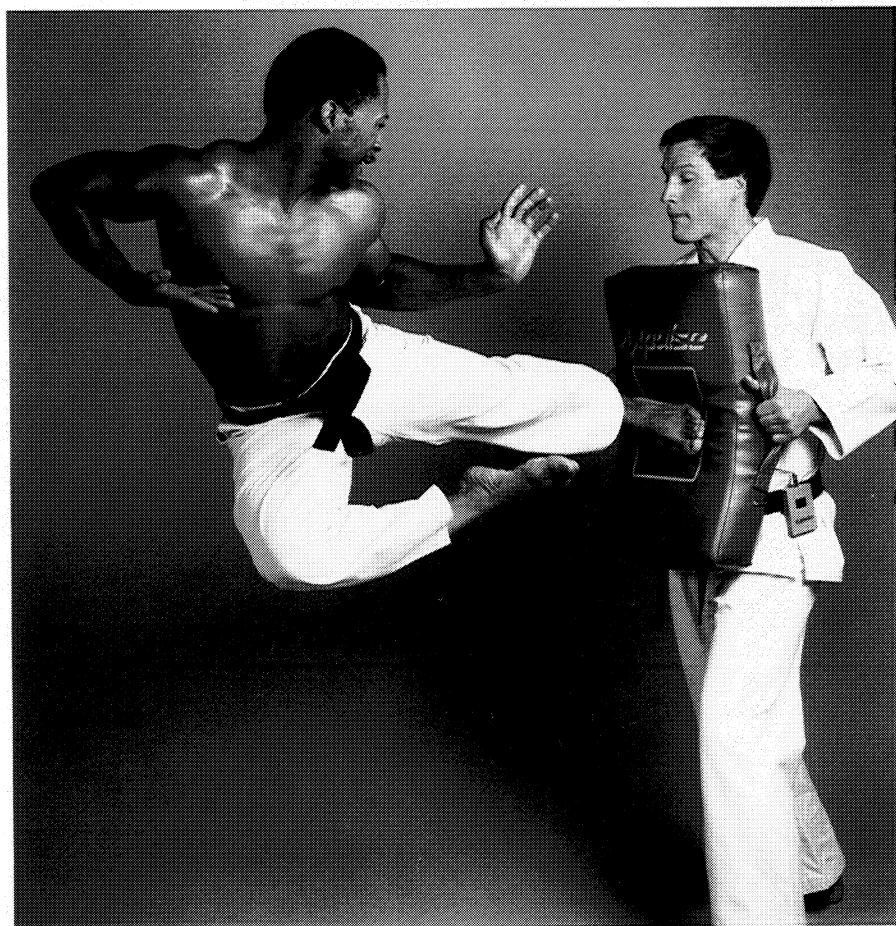
At the start of his development effort, French sought assistance from Lewis Research Center on available

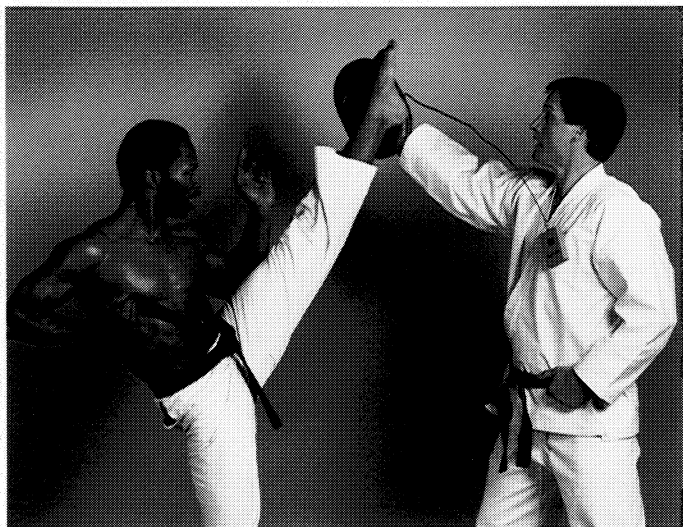
technologies that might be applicable to martial arts force measurement. During development, Lewis provided what French terms "invaluable technical assistance," advising on such matters as sensors, materials and optimum structures, directing French to firms with expertise in such technologies, and offering guidance toward problem solutions.

The Impax sensor is a piezoelectric film less than one thousandth of an inch thick, yet extremely durable. Similar to sensors that measure microscopic particle impacts in space, it gives out a voltage impulse when struck—the greater the force of impact, the higher the voltage. The impulse is transmitted to a compact electronics package, where the voltage is translated into a force-pounds reading and shown on a digital display.

Mounted on a sheet of plastic for protection, the sensor is affixed to several martial arts training products—for example, a body shield, a hand mitt, a heavy punching bag or a wall pad. The accompanying photos illustrate the use of Impax gear.

At left, Barry French (white jacket) holds an





Impax Body Shield while former European middle-weight kickboxing champion Daryl Tyler delivers an explosive jump side kick; the force of the impact is registered precisely and shown on the display panel of the electronic box French is wearing on his belt. A closeup look at the Body Shield is shown at left above, where French's wife Mary Ellen (also a black belt) and son Barry are the demonstrators. Above, Tyler high kicks an Impax mitt worn by French.

Among Impax users are martial arts instructors who are generally enthusiastic about the equipment's utility for generating competitive excitement among students, for testing and for charting students' power performance over time. Impax equipment is also used by serious martial arts practitioners as a

means of measuring and developing their own punch/kick power. The Sports Medicine and Science Group at the U.S. Olympic Committee Training Center is using Impax products for evaluation and training of boxers and Tae Kwon Do teams. The technology has been licensed to the largest manufacturers of football blocking sleds. Additionally, French reports that Impax Sports Training Systems have been well received as training tools for police de-

fensive tactics, providing a means of evaluating the performance of recruits (below). ▲

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